In the Claims:

Please cancel claims 1-5 without prejudice.

Please add the following claims.

6. (new) A solid titanium catalyst for homo-polymerization and co-polymerization of ethylene, wherein the catalyst is produced by:

preparing a magnesium compound solution by contacting a magnesium halide compound with an alcohol;

preparing a second solution by reacting the magnesium compound solution with an ester compound and a first silicon compound; and

reacting the second solution with a mixture of a titanium compound and a second silicon compound to produce the solid titanium catalyst.

7. (new) The solid titanium catalyst of claim 6, wherein the produced solid titanium catalyst is further reacted with a second titanium compound.

8. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises an ester compound having at least one hydroxy group.

9. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises an unsaturated aliphatic ester having at least one hydroxy group.

10. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises 2-

hydroxy ethylacrylate, 2-hydroxy ethylmethacrylate, 2-hydroxy propyl acrylate, 2-hydroxy propylmethacrylate, 4-hydroxy butylacrylate, or pentaerithritol triacrylate.

11. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises an aliphatic monoester having at least one hydroxy group or an aliphatic polyester having at least one hydroxy group.

12. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises 2-hydroxy ethyl acetate, methyl 3-hydroxy butylate, ethyl 3-hydroxy butylate, methyl 2-hydroxy isobutylate, ethyl 2-hydroxy isobutylate, methyl 3-hydroxy-2-methyl propionate, 2,2-dimethyl-3-hydroxy propionate, ethyl-6-hydroxy hexanoate, t-butyl-2-hydroxy isobutylate, diethyl-3-hydroxy glutarate, ethyllactate, isopropyl lactate, butyl-isobutyl lactate, isobutyl lactate, ethyl mandelate, dimethyl ethyl tartrate, ethyl tartrate, dibutyl tartrate, diethyl citrate, triethyl citrate, ethyl-2-hydroxy-caproate, or diethyl *bis*-(hydroxymethyl) malonate.

13. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises an aromatic ester having at least one hydroxy group.

14. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises 2-hydroxy ethyl benzoate, 2-hydroxy ethyl salicylate, methyl-4-(hydroxy methyl) benzoate, methyl-4-hydroxy benzoate, ethyl-3-hydroxy benzoate, 4-methyl salicylate, ethyl salicylate, phenyl salicylate, propy-4-hydroxy benzoate, phenyl-3-hydroxy naphthanoate, monoethylene glycol monobenzoate, diethylene glycol benzoate, or triethylene glycol monobenzoate.

15. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises an alicyclic ester having at least one hydroxy group.

16. (new) The solid titanium catalyst of claim 6, wherein the first silicon compound comprises a

silicon compound having an alkoxy group.

17. (new) The solid titanium catalyst of claim 6, wherein the first silicon compound comprises the general formula $R^1_nSi(OR^2)_{4-n}$, wherein R^1 comprises a hydrocarbon having between 1 to 12 carbons, wherein R^2 comprises a hydrocarbon having between 1 to 12 carbons, and wherein n comprises an integer between 0 and 3.

18. (new) The solid titanium catalyst of claim 6, wherein the first silicon compound comprises dimethyldimethoxy silane, dimethyldiethoxy silane, diphenyldimethoxy silane, methylphenyldimethoxy silane, diphenyldiethoxy silane, ethyltrimethoxy silane, vinyltrimethoxy silane, methyltrimethoxy silane, phenyltrimethoxy silane, methyltriethoxy silane, ethyltriethoxy silane, vinyltriethoxy silane, butyltriethoxy silane, phenyltriethoxy silane, ethyltriisopropoxy silane, vinyltributoxy silane, ethylsilicate, butylsilicate, or methyltriaryloxy silane.

19. (new) The solid titanium catalyst of claim 6, wherein the titanium compound comprises the general formula $Ti(OR)_aX_{4-a}$, wherein R comprises an alkyl group with 1 to 20 carbon atoms, wherein X comprises a halogen atom, and wherein a comprises an integer between 0 and 4.

20. (new) The solid titanium catalyst of claim 6, wherein the titanium compound comprises a titanium tetrahalide, wherein the titanium tetrahalide comprises $TiCl_4$, $TiBr_4$, or TiI_4.

21. (new) The solid titanium catalyst of claim 6, wherein the titanium compound comprises an alkoxy-titanium trihalide, wherein the alkoxy-titanium trihalide comprises $Ti(OCH_3)Cl_3$, $Ti(OC_2H_5)Cl_3$, $Ti(OC_2H_5)Br_3$, or $Ti(O(i\text{-}C_4H_9))Br_3$.

22. (new) The solid titanium catalyst of claim 6, wherein the titanium compound comprises an alkoxy-titanium dihalide, wherein the alkoxy-titanium dihalide comprises $Ti(OCH_3)_2Cl_2$, $Ti(OC_2H_5)_2Cl_2$, $Ti(OC_2H_5)_2Br_2$, or $Ti(O(i\text{-}C_4H_9))_2Cl_2$.

23. (new) The solid titanium catalyst of claim 6, wherein the titanium compound comprises a tetraalkoxy-titanium compound, wherein the tetraalkoxy-titanium compound comprises $Ti(OCH_3)_4$, $Ti(OC_2H_5)_4$, or $Ti(OC_4H_9)_4$.

24. (new) The solid titanium catalyst of claim 6, wherein the second silicon compound comprises the general formula R_nSiCl_{4-n}, wherein R comprises hydrogen, or R comprises an alkyl group, an alkoxy group, a haloalkyl group, or an aryl group having 1 to 10 carbon atoms, or R comprises a halosilyl group or a halosilyl alkyl group having 1 to 8 carbon atoms, and wherein n comprises an integer between 0 and 4.

25. (new) The solid titanium catalyst of claim 6, wherein the second silicon compound comprises silicon tetrachloride.

26. (new) The solid titanium catalyst of claim 6, wherein the second silicon compound comprises a trichlorosilane, wherein the trichlorosilane comprises methyltrichlorosilane, ethyltrichlorosilane, or phenyl-trichlorosilane.

27. (new) The solid titanium catalyst of claim 6, wherein the second silicon compound comprises a dichlorosilane, wherein the dichlorosilane comprises dimethyldichlorosilane, diethyldichlorosilane, diphenyldichlorosilane, or methylphenyldichlorosilane.

28. (new) The solid titanium catalyst of claim 6, wherein the second silicon compound comprises trimethylchlorosilane.

29. (new) The solid titanium catalyst of claim 6, wherein the ester compound comprises 2-hydroxyethyl methacrylate, wherein the first silicon compound comprises silicon tetraethoxide, wherein the titanium compound comprises titanium tetrachloride, and wherein the second silicon

compound comprises silicon tetrachloride.

30. (new) A method for producing a solid titanium catalyst, comprising:

preparing a magnesium compound solution by contacting a magnesium halide compound with an alcohol;

preparing a second solution by reacting the magnesium compound solution with an ester compound and a first silicon compound; and

reacting the second solution with a mixture of a titanium compound and a second silicon compound to produce the solid titanium catalyst.

31. (new) A solid titanium catalyst for homo-polymerization and co-polymerization of ethylene, wherein the catalyst is produced by:

preparing a magnesium compound solution by contacting a magnesium halide compound with an alcohol;

preparing a second solution by reacting the magnesium compound solution with an ester compound having at least one hydroxy group and a first silicon compound having an alkoxy group; and

reacting the second solution with a mixture of a titanium compound and a second silicon compound to produce the solid titanium catalyst.